Spencer. The result is a form of vitalism. The movement which is to be found in the inorganic world is not merely continuous with, but synonymous with life and consciousness. Matter is not only the revelation of spirit, but body and spirit are one and the same. His method, which consists simply in the assumption that human spirit is an *analogon* of the world-principle, will not bear this conclusion. And his superstructure is rather in the air.

In his view of evolution there is nothing novel. It is, of course, teleological. Its real dynamic, as opposed to its formal occasions, is the all-inclusive being as principle of organisation. The working of this is elucidated quite after the manner of Mr. Spencer, by what Herr Sack oddly calls "antinomies"—viz. the antithesis of individuality and community, and the like.

It is when he comes to deal with art, morals and religion that Herr Sack is most at home. These are man's adumbrations of the contents of the intellectual intuition of the universal spirit: Art, like ethics, is a social product. Ethics are treated in a manner on the whole definitely Spencerian, even to the condemnation of the social-democratic movement. In his discussion of religion, Herr Sack is opposed to Mr. Spencer, and, while owing a good deal to Prof. Max Müller, is original. Not in dreams with their presentment of the dead, not in natural phenomena like sunrise and sunset, not in anything so symbolic as totemism, does the matter of religion arise. They might confirm its sublimity; they are most of them too habitual and ordinary phenomena to create it. It is rather what suggests the invisible, the beyond, the infinite, that originates religious feeling—the horizon, the movement of the wind, the breath of life. Infinite space and infinite movement, and the *anima mundi*, are the elements of the religion of monism, and primitive religion was monistic. Cult degrades it into polytheism, and an interested priestcraft corrupts it; but monism has never been without a witness.

A world of spirits, in the spiritualist's sense, is of course incompatible with such a view. As is individual immortality. In truth, personality other than relative can belong only to the *Allwesen*, "in whom we live, and move and have our being."

In description, Herr Sack often shows a good deal of power. His views in the field of *Religionsforschung* doubtless express something of the truth, though not to the exclusion of other explanations. Indeed, the horizon, and the wind, and breathing are habitual too! Herr Sack's monistic formula, if true, must be established on other lines than his. Its only value here is that of any unverified vaticination that has brought peace to some of our fellow-men. H. W. B.

First Stage Hygiene. By Robert A. Lyster, B.Sc.Lond. Pp. viii + 199. (London: W. B. Clive, 1900.)

IN general character this book resembles those already available for students of elementary hygiene and public health. It is intended more particularly for students receiving lessons upon the lines of the syllabus of the Department of Science and Art, now the Board of Education, but it may also be used by other students. The order of treatment differs from that usually adopted, but it may be doubted whether in some cases the change is an improvement. A noteworthy point, however, is that, so far as possible, the physiological facts required to intelligently consider hygienic principles are dealt with as they are required, instead of being described in a separate section devoted to physiology. Another characteristic of the book is that simple experiments illustrating the points described are given at the ends of some of the chapters. There is still room for a book containing not only lecture experiments, but a good course of laboratory work to be done by individual students of hygiene.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Measurements in Schools. Collateral Heredity.

I AM at present engaged on an investigation into the strength of collateral heredity, *i.e.* the degree of resemblance for a variety of mental and physical characters of pairs of brothers, pairs of sisters, and pairs of brothers and sisters. In this matter I cannot seek the aid of parents, for they are scarcely unbiased observers, but I have to appeal for aid to those who teach in schools, and have thus an independent and often extensive knowledge of their pupils' characters. This is very frequently combined with the scientific training and caution which renders the teacher's aid of special value. As it is necessary to obtain measurements and observations of both sexes, I have appealed to both men and women teachers, and as it is also needful to combine the sexes (in the brother-sister measurements) to those working in elementary schools, as well as in boys' public schools and in girls' high schools. The result of my appeal has been to bring me a great deal of most valuable aid. Several high schools have been dealt with, four of our chief public schools have been, or are being measured, and a considerable variety of private, elementary and other schools. But a single public school (even of 500 to 700 boys) will often have only ten to twenty pairs of brethren, not, perhaps, as many as in a village national school, and I am most desirous of getting further help. The determination of the strength of collateral heredity is a problem of great scientific importance, and it can only be achieved by co-operative action. I have found so many teachers in all classes of schools willing to give disinterested aid in the cause of science that I venture to make a further appeal through NATURE for more assistance. Besides observations of physical and mental characters, which can be recorded without measurement, my data papers ask for certain head-measurements, which can, following the printed instructions, be taken quite easily. I shall be most glad to send sample papers to any one willing to assist, and if, after considering these, they find themselves able to assist, say by filling in data papers for ten or more pairs of brothers or sisters, I will at once despatch a head-spanner, of which I have several at the present time, free. The head-spanner should not be retained (unless under special circumstances) for more than a few weeks. Where the school is a small one, one master has, as a rule, filled in the papers entirely; in larger schools, one of the science masters, or even the medical officer, has done the head-measurements, and the other data have been provided by house, form or consulting masters. In the ultimate publication of the statistics all aid will be duly acknowledged, but I make the appeal for help simply on the ground that the investigation of heredity is to-day one of the most important scientific problems, and that its exact quantitative determination is well within the reach of co-operative observation. KARL PEARSON.

University College, London.

The Perseid Meteoric Shower.

IN the years from 1893 to 1899 inclusive, about 120 determinations of the Perseid radiant were made. With the exception of three or four positions, the dates of the observations ranged from August 1 to 16, while the majority were for August 10 and 11 only.

It seems of little use to continue accumulating observations of the radiant point on and near the date of its maximum. What we essentially require are observations of the earlier stages of the shower during the last half of July, and as the present year offers a good prospect for obtaining them, I trust observers will make a special effort in this direction. The moon will reach her last quarter on July 19, and will prove a very slight hindrance to observation during the ensuing fortnight. When the sky is clear it should be watched all night, the paths of such meteors as are visible carefully recorded, and the results for each date kept separate, so that the place of the Perseid radiant may be traced in its diurnal motion of about 1° to the E.N.E. Some really good determinations of the radiant in July would be valuable, for very few have ever been made owing to the

comparative feebleness of the shower in this month. An observer, however, who extends his watch over a long period, if not over the whole of the night, will find little difficulty in mapping a sufficient number of Perseids to indicate a good radiant.

Bishopston, Bristol, June 10. W. F. DENNING.

Variations in Plants of the Herb Paris.

THE enclosed table, showing the variations in 200 plants of Herb Paris, picked this month in the woods near Wells, may be of interest to some of your readers, especially if looked at in connection with the memorandum written by Sir Edward Fry, which he is kind enough to allow me to send with it.

L. ELEANOR JEX-BLAKE.

HERB PARIS.

Plants	Leaves	Sepals	Petals	Stamens	Cells of Ovary	Styles
96 } normal flowers	4	4	4	8	4	4
44 } normal flowers	5	4	4	8	4	4
2 } normal flowers	6	4	4	8	4	4
13	5	5	4	9	4	4
8	5	4	4	9	4	4
5	4	4	4	9	4	4
2	4	4	3	8	4	4
2	4	4	4	8	4	5
2	5	5	5	10	5	5
2	5	5	4	10	4	4
2	5	4	3	7	3	3
2	6	4	4	10	4	4
2	7	4	4	9	4	4
1	3	4	4	9	4	4
1	3	4	3	8	5	5, and one rudimentary
1	4	4	3	8	4	5
1	4	5	3	9	4	4
1	4	5	4	9	4	4
1	4	4	4	10, one double	4	4
1	4	4	4	8	4	3
1	5	5	3	8	4	4
1	5	4	3	8	4	5
1	5	4	4	8, one double	4	4
1	5	4	4	8	3	2, and one rudimentary
1	6	4	4	9	4	4
1	6	6	4	8	4	4
1	6	5	3	8	3	3
1	6	5	4	9	5	5
1	6	5	4	9	4	4
1	6	4	3	9	4	4
1	5½	4½	3	8	4	4
	two halves grew together					

[Miss Jex-Blake's table seems to me to show many points of interest.

The Herb Paris has long been known to be very variable in the number of its parts; this table quantifies (I use the word, though it used to make a friend of mine very angry) the variability of the plant. It shows that, taking the 96 plants as exhibiting the normal form, more than one-half, *i.e.* 104 out of 200, vary from the standard; that the most variable element is the circle of stem leaves; and that looking at the flowers alone, 142 plants out of 200 are normal, 58 only abnormal; that the 58 thus varying plants fall into no less than 28 groups; that not only do the plants vary as wholes, but that parts usually the same in number, or multiples of the same number, do not maintain this relation, *e.g.* that in 13 plants you get 5 sepals, 4 petals and 9 stamens, and so on.

The plant being thus given over to variability and belonging to the great group of monocotyledons, in which 3 and multiples of 3 are the dominant number for the parts of the flower, a systematist might expect that the variations of the Herb Paris would oscillate round 3, or a multiple of 3, as the standard form; but, in fact, they oscillate round 4 as the dominant number, the 96 normal plants having that number, or a multiple of that number, everywhere, and 44 plants having that number and multiple everywhere except in the leaves. Nature, therefore, disappoints our reasonable expectation.

It has, I believe, been suggested that the flower of Herb Paris is ideally of 6 and 12 parts, and that it has been reduced to 4 and 8 parts by atrophy and suppression of 2 and 4 parts respectively. If this were a true theory, you would expect to find here and there a reversion to the ancestral form; but the table shows that the number 6 occurs in the floral parts once, and once only, viz. in the sepals, and the number 12 never occurs in the stamens or elsewhere, so that the suggestion of suppressed parts becomes highly improbable.

The Herb Paris wanders from the ordinary type of monocotyledons, not only in the number of the floral parts, but in having ramifying veins of the leaves in the place of parallel veins; there are other monocotyledons which have this variation in the leaf from the standard. Do they, too, show any tendency to vary in the number of the floral parts? or to put it in other words, is there any correlation of the two variations? I have not looked into the subject, but it might prove worth consideration.—E. F.]

May 25.

Quaternion Methods applied to Dynamics.

I SHALL be obliged if any of your readers can give me the titles of any works on statics, or dynamics, or any physical science which are based on Quarternion methods and use nothing but Quaternion symbols.

The end chapters of P. G. Tait's "Quaternions" give examples; Kelland and Tait work out the theory of strains using Quaternion methods, but neither of these suffice for the purpose I have in view, namely, to put into the hands of a student a text-book on dynamics, &c., written in Quaternion language.

Jubbelpore, June 1. W. G. BARNETT.

PLANT HYBRIDS.

HORTICULTURISTS have recognised that as time goes on they must look more and more to hybridisation for "new plants." Biologists are already pointing out that, if anything can, breeding experiments will add to our knowledge of "the species." For both of these reasons the current volume[1] of the Royal Horticultural Society's *Journal* is of very particular interest, seeing that it is in fact the detailed report of the Conference on Hybridisation and Cross-breeding held last summer. The present writer has already summarised in these pages[2] the chief facts of importance brought out in the two days' proceedings; but several of the papers have been elaborated and illustrated, while many further contributions have been sent in and are now published. The latter in particular call for further comment.

Speaking generally of the report, it may be said that it is of very great value as a record of parentage, as a storehouse of many facts, and as putting forth several interesting theories. Furthermore, among the contributors are amateur and professional horticulturists, scientific workers pure and simple, as well as men who combine the interests of both, and this is a decided step in the right direction. It is not to be expected that the collection of papers forms a complete treatise to guide the practical or theoretical student; useful points are only to be found among cases at present not to be reconciled together and along with striking differences of opinion.

The very discrepancies are, however, to be welcomed, for from them can be learned the work to which attention should be most ungrudgingly given in the future; and by the publication of the "Hybrid Conference Report" the Royal Horticultural Society will earn the gratitude of a larger circle than ever. In the present account it will be

[1] *Journ. R.H.S.* vol. xxiv. (April 1900), pp. 1–348; 123 Figs.
[2] NATURE, vol. lx. (No. 1552, July 27, 1899), pp. 305–307.